

## Space Weather Forecast

Issued on Thursday, 23 June 2022 at 13:22 Local

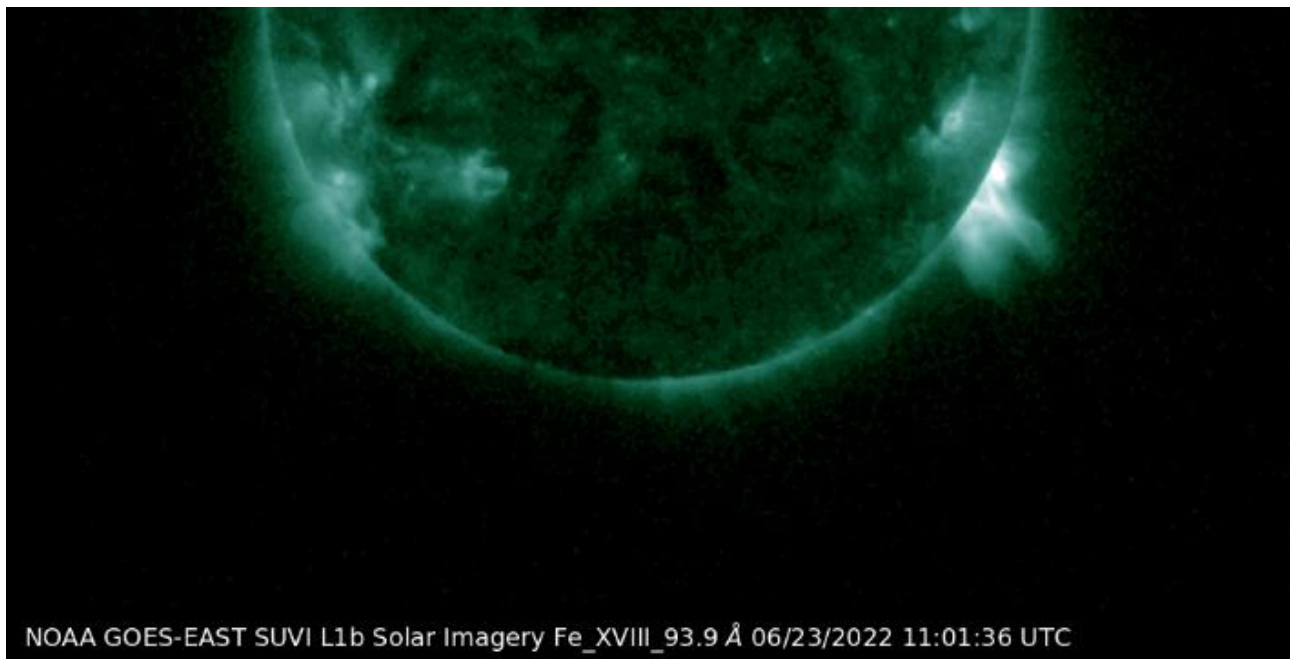
This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

**Space Weather Forecast Headline: Daily chance of an isolated moderate-class flare.**

### Analysis of Space Weather Activity over past 24 hours

**Solar Activity:** Solar activity has remained low over the past 24 hours, with occasional common-class flares becoming more isolated with time. This activity peaked with a long-lasting common class flare from the southwestern solar horizon at the end of the 24-hour reporting period, with the source not visible from an Earth-based perspective.

**Figure 1: False colour extreme-UV image of the aftermath of the long-period peak common class X-ray flare from the southwestern solar horizon. The source is uncertain, although any resultant CME is unlikely to have an Earth-bound component for being both too far west and below the Sun-Earth plane.**



There remain issues with the range and cadence of available satellite imagery at present, however there appear to be four sunspots on the sun. By far the largest and nominally the most complex remains in the western solar hemisphere, with a slight spreading trend evident. Its intermediate spots generally faded in the first half of the period, with a slight reversal in this tendency as the 24-hour period ended. Otherwise, the main changes in current sunspot groups were to a smaller region in the sun's southwest, which saw significant trailing spot decay.

Analysis of front side potential Coronal Mass Ejection (CME)-causing events has been somewhat hampered in the past 24 hours, however there were a few 'disappearing filaments' (arcs of plasma  
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that can leave the sun as CMEs) observed. These included one near the centre of the sun's facing side around the turn of the UTC day in the southern solar hemisphere, however there is not as yet any sign of any Earth-bound CME from this event. This is one of the main aspects of monitoring.

Other events appeared generally well toward both solar horizons to no presumed effect at Earth. Should thoughts on this change or more imagery become available, more thorough analyses will be conducted.

**Solar Wind / Geomagnetic Activity:** The solar wind speed was slightly elevated in the past 24 hours. The number of particles comprising the solar wind solar wind was similarly slightly elevated, while their associated magnetic field showed an early peak before smoothly declining. Overall, the above measures showed a trend towards a slow solar wind regime, but with the rising number of particles perhaps hinting at an impending fast wind stream from a 'coronal hole'. The net result of the above solar wind measures was provisionally mainly quiet, well below Minor Storm G1 throughout.

**Energetic Particles / Solar Radiation:** No solar radiation storms were observed.

## Four-Day Space Weather Forecast Summary

**Solar Activity:** Solar activity is likely to be low, with a daily chance of an isolated moderate-class flare. One large and complex spot nominally dominates in terms of flare risk and should remain on the front side throughout, while there are no forecast returning regions over the eastern solar horizon to bolster this.

**Solar Wind / Geomagnetic Activity:** No CMEs currently feature in the forecast.

Geomagnetic activity should be most reliably quiet at the end of the current four day period, with Earth expected to transit into the fast wind emanating from up to two 'coronal holes' in the interim. There is a slight chance at peak of Minor Storm G1 conditions, although being near the solstice these effects ought to be somewhat muted.

**Energetic Particles / Solar Radiation:** No solar radiation storms are expected in the period, although there remains nominally a daily slight chance of an S1 or greater event as a result of the largest sunspot gradually nearing the better-connected western solar horizon.

## Geomagnetic Storms:

| Geo-Magnetic Storm       | Level    | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) | Day 2 (00-24 UTC) | Day 3 (00-24 UTC) | Day 4 (00-24 UTC) |
|--------------------------|----------|------------------------|-------------------|-------------------|-------------------|-------------------|
| Probability (Exceedance) |          |                        | (%)               | (%)               | (%)               | (%)               |
| Minor or Moderate        | G1 to G2 | No                     | 1                 | 10                | 20                | 5                 |
| Strong                   | G3       | No                     | 1                 | 1                 | 1                 | 1                 |
| Severe                   | G4       | No                     | 1                 | 1                 | 1                 | 1                 |
| Extreme                  | G5       | No                     | 1                 | 1                 | 1                 | 1                 |

## Radio Blackouts - X Ray Flares:

| X Ray Flares | Level            | Past 24 Hours<br>(Yes/No) | Day 1<br>(00-24 UTC) | Day 2<br>(00-24 UTC) | Day 3<br>(00-24 UTC) | Day 4<br>(00-24 UTC) |
|--------------|------------------|---------------------------|----------------------|----------------------|----------------------|----------------------|
| Probability  |                  |                           | (%)                  | (%)                  | (%)                  | (%)                  |
| Active       | R1-R2<br>M Class | No                        | 25                   | 25                   | 25                   | 25                   |
| Very Active  | R3 to<br>R5<br>X | No                        | 5                    | 5                    | 5                    | 5                    |

## Solar Radiation Storms - (High Energy Protons):

| Radiation Storms            | Level<br>(cm <sup>-2</sup><br>sr <sup>-1</sup> s <sup>-1</sup> ) | Past 24 Hours<br>(Yes/No) | Day 1<br>(00-24 UTC) | Day 2<br>(00-24 UTC) | Day 3<br>(00-24 UTC) | Day 4<br>(00-24 UTC) |
|-----------------------------|------------------------------------------------------------------|---------------------------|----------------------|----------------------|----------------------|----------------------|
| Probability<br>(Exceedance) |                                                                  |                           | (%)                  | (%)                  | (%)                  | (%)                  |
| Active                      | ≥ S1                                                             | No                        | 5                    | 5                    | 5                    | 5                    |
| Very Active                 | ≥ S3 *                                                           | No                        | 1                    | 1                    | 1                    | 1                    |

\* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm<sup>-2</sup>sr<sup>-1</sup>s<sup>-1</sup>)